

Remarks

This paper is filed in response to the Official Action mailed by the USPTO on October 22, 2008 which provided a three months statutory period of time for reply with no additional fee. With this response, the previously presented claims are re-presented along with a rebuttal of the Examiner's sole rejection under 35 USC 103(a). Therefore, claims 1-2, 4, 7, and 9-14 remain pending in the case. Since this response is filed three months after the statutory period for reply provided, a petition for extension of time for three months is also submitted herewith and the Office is authorized to deduct the required fee for such petition from the assignee Monsanto's USPTO Deposit Account No. 13-4125 and to credit any overpayment thereto.

The Applicants thank the Examiner for withdrawal of previous rejections and objections.

Claim Rejections – 35 USC 103(a)

The Examiner has rejected claims 1-2, 4, 7, and 9-14 as allegedly obvious under 35 USC 103(a) based on the combination of art cited as Donovan et al (US Patent No. 5,322,687) (which the Examiner previously cited as a basis for asserting lack of novelty, and for alleging obviousness alone and in combination with Dun et al (WO99/23233), which were all overcome by previous remarks) in view of Koziel et al (WO 93/07278). It is believed that the objection is again rendered moot by the remarks presented below. Therefore it is respectfully requested that the Examiner reconsider this grounds of rejection and find that the claims are now in condition for allowance.

The Donovan et al. reference has previously been overcome, and so no additional remarks need be recited here. The Examiner correctly asserts that the Koziel et al reference teaches codon optimization of genes for expression in plants by incorporating at each and every codon position the most preferred plant codon from a plant codon table assembled from a plurality of plant genes. The Examiner's argument fails however because the claimed sequences are not representative of an optimized gene constructed according to the principles as taught in Koziel et al. The claimed sequences do not consist of the most preferred codons at every position. Koziel teaches only a single codon table, referencing Table 4 of Murray et al (Nucleic Acids Research (1989) 17:477-498) as the basis for identifying the most preferred codons from an assembly of particular plant genes' codon usage, and then assembling a synthetic gene encoding a Bt

insecticidal protein for use in plants using at each codon position of the assembled gene encoding a particular amino acid the same codon, i.e., the most preferred codon, selected from the Murray codon table. In this case, the claimed sequences do not recite the most preferred codon from Murray et al at each and every position, and so do not follow the teaching of Koziel et al, and therefore, the claimed sequences cannot be taken as obvious in view of the combination of Donovan and Koziel.

Taking the codon table shown in Murray et al, for example, and focusing on Alanine codons, for which there are four used in plants and typically in most other organisms. Alanine codons shown in the Murray table are broken down as being represented in dicots, monocots, and collectively averaging dicots and monocots together, plants. Since the claimed subject matter is not particularly limited to either monocots or dicots, the present argument will be limited to the plant codon column of Murray, however, the same argument would apply in any case, regardless of the codon table selected for identifying the most preferred codon used by plant genes for any particular amino acid. Murray et al teaches the four alanine codons and their respective percentages as used in plant genes as follows: GCG 11%, GCA 22%, GCT 37%, and GCC 30%. Thus, the most preferred alanine codon as taught by Koziel et al for use at each alanine codon position should be GCT, however, if the artisan were following Koziel et al to the letter, it would be expected that following Koziel for construction of a monocot plant would result in using GCC at every monocot alanine codon position because for the few number of monocot genes used by Murray et al to construct the codon table, GCC appeared to be used most frequently for alanine and not GCT.

Nevertheless, following the teachings of Koziel, one would select GCT for each alanine codon in an “optimized” gene. Looking at the claimed SEQ ID NO:3 for example, alanine appears 75 times throughout the coding sequence. GCA is used twice, GCC is used 38 times, GCG is used 22 times, and GCT is used 13 times. What is “obvious” is that the claimed sequences fail to use the method of Koziel et al by incorporating the “most preferred codon” at each position, but instead use a variety of codons across the spectrum of those available.

The Examiner’s argument rests on a failed assertion that the skilled artisan would have looked to Koziel for constructing the genes of the present invention, when in fact looking to Koziel would teach away from the claimed genes. The claims do not recite improved expression in plants, but instead recite a polynucleotide sequence optimized for expression in plants, an

expression cassette comprising the polynucleotide sequence, a plant comprising the sequence, a seed comprising the sequence, and a method for making a transgenic plant or plant cell expressing the insecticidal protein from the polynucleotide sequence. A genus of polynucleotides is not being claimed, but instead a single structural sequence is being claimed that is one of but several million possible sequences encoding the Cry1Bb1 toxin protein. Following the teachings of Koziel et al, a limited number of particular sequences could be constructed depending on the particular codon table the skilled artisan relied upon to recite the “most preferred codons” used in a particular plant species. The instant claims recite a sequence that would never fall within the scope of the limited number of sequences that could be constructed following the teachings of Koziel et al.

The balance of the Examiner’s argument related to promoters, obtaining seed and the sale of seed to farmers, untranslated leaders, introns, and terminators, and the requirement for a showing of unexpected results if unsupported in view of the references cited for the rejection based on 103(a) and are believed to be moot.

In view of the fact that Donovan et al. was previously removed as a reference either under 102 or 103, and in view of the fact that the above remarks are believed to have removed Koziel et al as a reference that can reasonably be relied upon for the purposes of obviousness, it is respectfully requested that the Examiner remove this grounds of rejection and find the claims in condition for allowance.

Should any questions arise or if Applicant or Applicant’s attorney can facilitate the examination of this application, it is respectfully requested that the PTO contact the undersigned attorney.

Respectfully submitted,

/ Timothy K. Ball, USPTO Reg. No. 42,287 /

Timothy K. Ball, Ph.D., Esq.
Reg. No. 42,287
800 North Lindbergh Boulevard
Mail Zone E1NA
St. Louis, Missouri 63167
(314) 694-5811
(314) 694-5311 (facsimile)